

WHAT IS CLAIMED IS:

1. A surface purification apparatus used in a manufacturing process of a semiconductor device or a liquid crystal display device, characterized by comprising

means for bringing steam into contact with and means for spraying steam onto a surface having need of purification, wherein said surface is purified.

2. A surface purification apparatus described in claim 1, characterized in that said surface is one selected from among process surfaces from a substrate to a semiconductor device, surfaces of process apparatus and process apparatus parts, and surfaces of apparatus and apparatus parts in relation to lithographic processes.

3. A surface purification apparatus described in claim 1, characterized in that said surface is processed with saturated or superheated steam at a temperature of 70°C to 200°C.

4. A surface purification apparatus described in claim 1, characterized by comprising a steam supply apparatus comprising a steam generation system, a steam-superheating system, a control system for supplied ultrapure-water quantity and heat amount, and a steam pressure control system, constructed with including a steam inlet and steam-spraying nozzle, and arbitrarily switching and supplying saturated or superheated steam at a temperature of 70°C to 200°C.

5. A surface purification apparatus described in claim 4, characterized in that said steam supply apparatus further includes a switching system for a supply line for a solution containing a purification promotion ingredient and said ultrapure water supply line, and an injection pump, and comprises a system for switching steam containing said purification promotion ingredient and steam not containing it.

6. A surface purification apparatus described in claim 1, characterized by comprising irradiation means for irradiating with ultraviolet rays, wherein said surface is processed in combination with processing of irradiating said surface with ultraviolet rays in said steam processing.

7. A surface purification apparatus described in claim 6, characterized in that said irradiation means uses an ultraviolet lamp of a wavelength corresponding to a 50% transmissive distance of not less than 10 mm to steam.

8. A one-by-one surface purification apparatus characterized in that a system for introducing steam, and a drive system in which a spraying surface is swept by a steam-spraying nozzle moving relatively to a surface being processed, are provided in a chamber including a substrate take in/out system and an atmosphere discharge system, and said steam-spraying nozzle sprays steam onto said surface.

9. A surface purification apparatus described in claim 1, characterized in that an ultraviolet reactor comprising an ultraviolet lamp of a wavelength corresponding to a 50% transmissive distance of not less than 10 mm to steam, is accompanied, said ultraviolet lamp is disposed in parallel with said surface, and said surface in steam processing is irradiated and processed.

10. A surface purification apparatus described in claim 8, characterized in that said atmosphere discharge system further comprises a suction system, and the surface being processed is dried by discharging the atmosphere in the chamber after superheated steam processing.

11. A surface purification method used in a manufacturing process of a semiconductor device or a liquid crystal display device, characterized in that,

by using a process for bringing steam into contact with a surface having need of purification, and

a process for spraying steam onto the surface having need of purification,

said surface is processed.

12. A surface purification method described in claim 11, characterized in that said surface is one selected from among process surfaces from a substrate to a semiconductor device, surfaces of process apparatus and process apparatus parts, and surfaces of

apparatus and apparatus parts in relation to lithographic processes.

13. A surface purification method described in claim 11, characterized in that said surface is processed with saturated or superheated steam at a temperature of 70°C to 200°C.

14. A surface purification method described in claim 11, characterized in that said surface is processed in combination with processing of irradiating said surface with ultraviolet rays of a wavelength corresponding to a 50% transmissive distance of not less than 10 mm to steam, in said steam processing.

15. A surface purification method described in claim 14, characterized in that organic matters having adhered to said surface are removed by said steam processing and said process of irradiating with ultraviolet rays.

16. A surface purification method described in claim 14, characterized in that an organic matter film formed on said surface is removed by said steam processing and said process of irradiating with ultraviolet rays.

17. A surface purification method described in claim 14, characterized in that particles having adhered to said surface are removed by said steam processing and said process of irradiating with ultraviolet rays.

18. A surface purification method described in claim 13, characterized in that generation of water marks is staved off by discharging the atmosphere in the chamber after superheated steam processing of said surface, and drying the surface being processed.

19. A surface purification method described in claim 11, characterized in that said surface is a silicon substrate, and said silicon surface is made to be a hydrogen termination structure by steam-processing silicon exposed on said silicon substrate surface.